

SECTION 275113 – AUDIO/VISUAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section describes audio/visual displays. The work includes interactive projector-whiteboard units, speakers, amplifier, mountings and wiring complete and ready for use.
- B. All necessary equipment and installation materials whether or not specified shall be furnished in order to provide complete and satisfactory operating systems.

1.2 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Section 260010.
- B. Shop Drawings: The following items shall be submitted for review and approval:
 - 1. Submittal booklet to include the following:
 - a. Reference to Specification Section.
 - b. A list of all equipment to be provided and installed.
 - c. Data sheets to indicate equipment to be supplied with installation instructions and system wiring diagrams with specific item or model number highlighted.
 - d. Proposed block diagram showing locations and arrangement of signal processing equipment in a flow diagram format.

1.3 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section.
- B. Operation Data: Include instructions for operating equipment. Include instructions for operating equipment under normal conditions.
- C. Maintenance Data: Include data in the maintenance Manual specified in Non-Technical Specifications and Division 26 Section "Basic Electrical Requirements".
- D. Maintenance Instructions: Submit manufacturer's printed instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under use conditions. Submit three complete sets of operating instructions including wiring and circuit diagrams. All manuals shall be delivered on CD-ROM. Site specific wiring diagrams and installation information shall be in PDF format with book-marked links.

- E. Inventory: Supply with the manuals an inventory of the equipment provided.

1.4 QUALIFICATIONS

- A. Manufacturer: Equipment manufactured by Crestron, Biamp and others as named shall be considered as meeting these specifications.
- B. Pre-approved vendor – Sage Technology Solutions, Inc. – Charlie Mowrer – 717-653-6641.
- C. Supplier: The supplier must have a minimum of five years of experience in the design and installation of systems equal in size and type required by this project. The supplier must maintain a local service organization within a fifty (50) mile radius of the installation with spare service replacement boards, components and accessories. Supplier must have on staff, employees with the following credentials; a Crestron DMC-D, DMC-E and CTS, CTS-D and CTS-I. Supplier must also be an InfoComm Diamond Level Solutions Service provider. Contractor must supply credentials with the submittals. Contractors that do not have employees in-house with these credentials will be rejected.
- D. The supplier must be the authorized representative of the equipment manufacturer supplied and have full-time technicians trained and certified in the installation and service of the equipment supplied. The supplier must supply with the shop drawing submittal a list of five installations (along with contact personnel) of the proposed control equipment provisioned by the proposed installation team.

1.5 REGULATORY REQUIREMENTS

- A. NEC Compliance: Comply with NEC requirements as applicable to construction, installation and color coding of both power type wires/cables and control/signal transmission media.
- B. UL Compliance: Comply with applicable requirements of UL Stds 83, “Thermoplastic-Insulated Wires and Cables” and 486A, “Wire Connectors and Soldering Lugs for Use with Copper Conductors”. Provide products which are UL listed and labeled.
- C. NEMA/ICE Compliance: Comply with NEMA/ICEA Stds Pub/No’s WC 5, “Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy”, and WC 30, “Color Coding of Wires and Cables”, pertaining to control and signal transmission media.
- D. FCC Compliance: Comply with US Federal Communications Commission Class B standard for allowable radiation for network equipment and wiring. Comply with all applicable standards regarding RF emission in CATV Systems.

- E. Electrical Code Compliance: Comply with applicable local code requirements of the authority having jurisdiction, and that portion of the NEC which pertains to installation and construction of specified products.
- F. Institute for Electrical and Electronic Engineers (IEEE): Comply with all applicable standards for audio, video, and data networks.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to project site in original factory wrappings and containers, clearly labeled with identification of manufacturer. Inspect equipment to ensure that no damage has occurred during shipment. Do not install damaged equipment; remove from site and replace damaged equipment with new.
- B. Store materials in original packages and containers, inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity; laid flat, blocked off ground to prevent sagging and warping. Protect products from weather, damaging fumes, construction debris and traffic.
- C. Handle wire and cable carefully to avoid abrading, puncturing and tearing wire and cable insulation and sheathing. Ensure that dielectric resistance and characteristic impedance integrity of transmission media are maintained.
- D. Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.
- E. Bring to the job site only the quantities of materials which can be installed in one days time. The Owner will not provide on-site storage areas for the Contractor.

1.7 MAINTENANCE SERVICE WARRANTY

- A. Provide the warranty specified in Section.

PART 2 - PRODUCTS

2.1 AV Exercise Theater REMOTE SOUND SYSTEM

- A. Provide a locally controlled sound system complete with loudspeakers, wireless and wired microphones, video presentation system and source equipment housed in a floor mounted equipment rack.
- B. The Mixer/Digital Signal Processor shall be provided with sixteen balanced mic/line inputs. The processor shall be fed by the CD changer and two wireless microphones. The Digital Signal Processor Controller shall provide Gain Management/Limiter/

Equalizer/Delay/Mix Matrix functions for loudspeakers with inputs and outputs as listed. The processor shall have programmable capability enhanced by full complement of audio devices available from a Win32 based Graphical User Interface (GUI). Audio processing devices available are, but not limited to: automatic mixers, crossovers, AGC, gates, limiters, expanders, duckers, delay lines, meters, mixers, routers, test signal sources, room and ring mode equalizers, and automatic "dynamic search and delete" feedback filters. The system shall have 24-bit A/D and D/A converters and RS-232/485 connection for remote serial control functions. The digital signal processor shall have a frequency response of ± 0.5 dB or better from 20 Hz to 20 kHz. Its total harmonic distortion shall be no more than 0.01% from 20 Hz to 20 kHz with a +4 dBu input signal and a +4 dBu output signal, both with 20 dB of headroom. It shall have a dynamic range of not less than 103 dB A-weighted. Input common mode rejection ratio (CMRR) shall be greater than 55 dB at any gain setting. The maximum input level without clipping shall be +30 dBu while maintaining the specified CMRR. The maximum output level shall be +24 dBu while still meeting the frequency response specification. The balanced input impedance shall be 6k ohm or higher. The balanced output impedance shall be 102 ohms and designed to drive 600 ohm loads or greater while maintaining the specified frequency response. Provide system with outputs for ceiling loudspeakers, video system and assisted listening system. Provide one (1) Biamp Nexia CS for the system.

- C. Provide two wireless microphone systems. System shall be: two (2) Audio Technica Model ATW-R3100C agile UHF wireless mic system receivers. Receivers shall have LCD display with channel assignment AF & RF signal levels, and battery fuel gauge. Provide two (2) Audio Technica Model ATW-T341 handheld transmitters. Provide antenna distribution amplifiers as required to feed the above receivers from two remote antennas. Provide necessary rack mount kits. MiPro ACT-7-Series and Shure ULXP Series with unidirectional lavalier microphones shall be considered equal. Systems must allow up to 24 simultaneous microphone systems in operation at the same site. All wireless microphones on the project shall be the same series for interchangeability.
- D. Provide one (1) 500 watt amplifier channel into 70volts. Provide Crown CDi series amplifier.
- E. The CD player shall be Tascam Model CD200i with integral iPod dock and rackmount.
- F. The AC Power control panel shall be rack mounted with front panel switch, rear panel outlets, and built-in surge/noise filtering. Provide sequential (amps on last off first and staged for inrush protection) remote power up from master volume control panel locations. Provide all power control outlets as required for locations and loads of equipment specified herein.
- G. Provide a rack mounted four (4) space storage drawer.

- H. Provide a Middle Atlantic ERK-35-25 floor rack. Provide solid front door and blank panels as required.
- I. Provide one (1) Middle Atlantic Products Model UPS-2200R-IP Web Enabled Rack Mounted UPS and install in the rack.

2.2 AV Exercise Theater LOUDSPEAKERS

- A. Provide six (6) Community DS8 loudspeakers and install in locations as shown on the drawings.

2.3 AV Exercise Theater VIDEO SYSTEM

- A. Provide two (2) Panasonic PT-EZ770ZU- 6500 lumen LCD video projector with appropriate projector lens. Provide with Chief RPAU-W and pole in length as required.
- B. Provide two (2) Da-lite 70222L Advantage Electrol – 16:10 Wide format projection screen with low voltage control. Screens shall have a 137" diagonal.
- C. Provide one (1) Crestron DMPS-300-C Digital Media Presentation System 300. Install in sound system equipment rack. Run the presentation system audio through the local sound system loudspeakers.
- D. Provide two (2) Crestron DM-RMC-SCALER-C Digital Media 8G Controller and DM CAT receivers for the two of the projectors.
- E. Provide one (1) Crestron TSW-752 – 7" Touch Screen and mount in location as directed by the Owner.
- F. Provide one (1) LG Electronics BD650 Blu-ray disc player. Provide shelf and mount in the equipment rack.

2.4 ASSISTIVE LISTENING SYSTEMS

- A. Provide the AV Exercise Theater with a Telex Model ST200 assistive listening transmitter, high gain remote antenna, and necessary interface. Provide a total of 3 (3) SR50 multi-channel receivers with SEB-1 earbuds and alkaline batteries for use with the systems. Equal equipment by Listen Technologies shall be acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine areas and conditions under which systems are to be installed, and notify Architect and Engineer in writing of conditions detrimental to proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- B. All wiring installed shall be plenum rated.
- C. Cable Identification: Each installed cable must be labeled with the following information at both points of termination of the cable run: distribution frame number, node number, jack designation. End point and media type information must be sufficient to uniquely identify and cable in the network and shall be documented in a cable management system.
- D. Cable runs are to be installed in a neat and clean fashion and shall not rest directly on ceiling tiles, hanging wires and not be attached to those of the ceiling grid suspension system.
- E. Comply with installation and complete setup instructions provided by system manufacturer. Obtain projector setup protocol to program control functions via cable interface.
- F. Install system to comply with drawings and final shop drawings in compliance with manufacturer's printed instructions.
- G. Provide all necessary conduit, raceways, sleeves, fire stopping, pull boxes and outlet boxes as required.
- H. Verify all dimensions with General Contractor before installing mounting.
- I. Provide additional supports and blocking required for projector mounts.

3.2 TERMINATION

- A. The installation firm qualified by the criteria listed above must perform all terminations at device and headend locations.

3.3 GROUNDING

- A. Comply with Section 260526 and applicable details on plans.

3.4 TRAINING

- A. Upon completion of installation, arrange in service training of the system operation for personnel designated by the owner. Provide a minimum of two (2) hours of training for user and system administrator specifics. Notify in writing through the Architect, Construction Manager, and the Owner of the time and date the first demonstration will take place. Conduct a walking tour of the system.

END OF SECTION 275113